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General References

Although books on flow cytometry abound and articles on flow cytometry can be found throughout a great range of publications, the following is a limited list of references that I have found particularly useful for general information on the theoretical basis of flow analysis and as routes into the literature on particular subjects and techniques.

BOOKS

Bauer KD, Duque RE, Shankey TV, eds. (1993). *Clinical Flow Cytometry: Principles and Application*. Williams & Wilkins, Baltimore. A multiauthor compendium of flow cytometry in clinical practice.

Darzynkiewicz Z, Robinson JP, Crissman HA, eds. (2001). *Methods in Cell Biology*, Vols 63A and 63B. *Cytometry*, 3rd edition. Academic Press, San Diego. An up-to-date compilation covering theory and many practical aspects of flow and image cytometry. The previous edition of this book (Vols. 41A and 41B, 1994) contains many articles on many subjects not covered in the third edition and is also worth reading.

Diamond RA, DeMaggio S, eds. (2000). *In Living Color: Protocols in Flow Cytometry and Cell Sorting*. Springer, Berlin. A collection of detailed methods, covering all aspects of flow cytometric analysis.

Keren DF, Hanson CA, Hurtubise PE, eds. (1994). *Flow Cytometry and Clinical Diagnosis*. American Society of Clinical Pathologists Press, Chicago. A good summary of issues related to the practice of clinical cytometry.

Melamed MR, Lindmo T, Mendelsohn ML, eds. (1990). *Flow Cytometry and Sorting*, 2nd edition. Wiley-Liss, Inc, New York. A classic and very thick (824 page) multiauthor volume, containing thorough review articles on the theory and practice of flow cytometry by acknowledged experts.

Ormerod MG, ed. (2000). *Flow Cytometry: A Practical Approach*. Oxford University Press, Oxford. A useful book with discussion of flow theory but with an emphasis on practical aspects of flow cytometry and technical protocols.

Ormerod MG (1999). *Flow Cytometry*. Bios Publishers, Oxford. Short and sweet.

Owens MA, Loken MR (1995). *Flow Cytometry: Principles for Clinical Laboratory Practice*. Wiley-Liss/John Wiley and Sons, Inc, New York. A discussion of the theory and practice of clinical flow cytometry, with some good emphasis on quality control.

Robinson JP, ed. (1993). *Handbook of Flow Cytometry Methods*. Wiley-Liss/John Wiley and Sons, Inc, New York. An informal, detailed manual of techniques, protocols, and supplies that are relevant to flow cytometric analysis.

Robinson JP et al., eds. (2000). *Current Protocols in Cytometry*. John Wiley and Sons, Inc, New York. An ever-increasing volume (in ring-binder/loose-leaf or CD format) with articles on the theory of flow cytometry and image analysis as well as excellent discussions on the practical methodologies. It is kept current with quarterly supplements.

Shapiro HM (1995). *Practical Flow Cytometry*, 3rd edition. Wiley-Liss/John Wiley and Sons, Inc, New York. This wonderful book manages to make learning about flow cytometry more enjoyable than you would have thought possible. There are readable sections on most aspects of flow theory and an excellent compendium of references. A fourth edition is, I believe, in the works.

Stewart CC, Nicholson JKA, eds. (2000). *Immunophenotyping*. Wiley-Liss/John Wiley and Sons, Inc, New York. A multiauthor volume with an emphasis on clinical leukemia and lymphoma phenotyping, but with useful articles on general phenotyping issues, on

HIV infection, CD34 stem cell enumeration, platelets, and transplantation cross-matching.

Van Dilla MA, Dean PN, Laerum OD, Melamed MR, eds. (1985). *Flow Cytometry: Instrumentation and Data Analysis*. Academic Press, London. A venerable, but still current book with an emphasis on the physics and mathematics of flow systems and data analysis. It has some excellent (and readable) articles on some theoretical subjects.

Watson JV (1991). *Introduction to Flow Cytometry*. Cambridge University Press, Cambridge. A somewhat idiosyncratic tour through the many theoretical aspects of flow cytometry with which Watson is well-acquainted. There are detailed discussions of the limits on signal resolution, on cell coincidence in the laser beam, and on methods for looking at dynamic cell events. There is also good coverage of oncological applications but no mention at all of lymphocytes.

Watson JV (1992). *Flow Cytometry Data Analysis: Basic Concepts and Statistics*. Cambridge University Press, Cambridge. A detailed look at the ways we can (or should) analyze data—after we leave the flow cytometer.

Weir DM, ed. (1986). *Handbook of Experimental Immunology*, Vol 1: *Immunochemistry*. Blackwell Scientific Publications, Oxford. A detailed reference volume on many aspects of immunology, including immunofluorescence techniques and antibody conjugation methods as well as flow cytometric analysis. A newer edition (1996) of Weir's *Handbook of Experimental Immunology* (edited by Leonore Herzenberg) is also available—in four volumes.

CATALOGUES

The following are catalogues and handbooks from manufacturers. They are free and, even at ten times that price, would be well worth owning. Most are available in either paper or CD-ROM versions.

Melles Griot Catalog (<http://www.mellesgriot.com/>). This paper or CD guide provides a great deal of theoretical information about filter, lens, mirror, and laser specifications and design as well as about the Melles Griot range of products.

Molecular Probes: Handbook of Fluorescent Probes and Research Chemicals, by Richard P. Haugland. Molecular Probes (<http://www.molecularprobes.com/>) makes a vast range of fluorescent chemicals that are useful in flow cytometric analysis. The website and the paper or CD Handbook provide a great deal of information about the use of these chemicals as well as about their photochemical characteristics. A required reference book for every flow cytometrist.

Hamamatsu Corporation (<http://www.usa.hamamatsu.com/>). This website contains a good discussion of photomultiplier tube electronics. We all need to be reminded occasionally that a flow cytometer's performance is never any better than the performance of its photo-detectors.

Boehringer Mannheim Biochemicals publishes a very useful manual on "Apoptosis and Cell Proliferation."

MISCELLANEOUS

The journal that specializes in research reports about flow techniques and flow analysis (as well as image analysis) is *Cytometry*. Its paired publication is *Communications in Clinical Cytometry*. The *Journal of Immunological Methods* is also often useful in this regard.

The International Society for Analytical Cytometry (ISAC, 60 Revere Drive, Suite 500, Northbrook, IL 60062; <http://www.isac-net.org>) is the society that specializes in flow and image cell analysis. Meetings (attended by about 1000 people) are held every 2 years (sometimes in the United States and sometimes in Europe).

The U.S. National Flow Cytometry Resource is at the Los Alamos National Laboratory (Los Alamos, NM 87545). They are a source of information and inspiration and provide help and facilities for scientists wanting to make use of their "state-of-the art" cytometers. They also run flow cytometry training courses.

Websites on flow cytometry reflect the idiosyncracies of their authors. Many are excellent. For current listings of this ever-changing scene, search the Purdue University Cytometry Laboratories website (<http://www.cyto.purdue.edu/>) or the ISAC web site (<http://www.isac-net.org/>).

There is an e-mail network for informal discussion on flow issues. It has, as of this writing, 1999 members. Participants in this network are a singularly helpful and generous group of people. The network is run by Paul Robinson and Steve Kelley from Purdue University. Sign up by writing to Steve Kelley (cyto-request@flowcyt.cyto.purdue.edu).

Courses on flow cytometry are held at various locations, mainly during the summer. For current listings check the Purdue website (<http://www.cyto.purdue.edu/>), which is usually as up-to-date as possible.